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TECHNOLOGY DEPT.

SCIENCE NEWS LETTER

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JUL 11 1944

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JULY 8, 1944



Cotton in Colors

See Page 26

A SCIENCE SERVICE PUBLICATION

KEEPING UP WITH *Electricity*

ORDNANCE SPELLS IT F-U-Z-E, when referring to the mechanical device that keeps bombs safe to handle, but sets them to detonate on impact. If bombs are to be both safe and effective, fuze-timing must be accurate to a split second. To test them, Westinghouse engineers designed a new miniature wind tunnel, in which a blast of compressed air simulates speeds up to 800 miles an hour. A photoelectric cell device checks the timing to one one-hundred-twentieth of a second.

NEW FLUORESCENT DEVELOPMENTS include a *cold cathode* tube that lights up instantly; a new type of starter that eliminates blinking of fluorescent lamps; and a bulb so tiny that it can operate for several weeks on power from a single dry cell.

TOO GOOD. A short time after a large non-condensing turbine was placed in service by a large industrial company, the designer was called back to do further work in it. Reason: it was *too* efficient! Temperature of the exhaust steam was too low for plant process work. Machine is now operating with a satisfactory degree of *inefficiency*.

HEIGHT BY LIGHT is the basis of a device that is making flying safer. A beam of light from a 16-inch searchlight locates cloud layers; using an alidade (similar to a sextant) an observer sights the bright spot made by the beam. By triangulation, the height of the clouds can be calculated exactly in a matter of seconds, and this ceiling height is then radioed to the planes in the vicinity.

NEW HURRICANE is now in service with Boeing Aircraft Company. Westinghouse has just installed an 18,000 horsepower electric motor to drive the multi-bladed fan in Boeing's new wind tunnel. One of the largest operated by a private aircraft manufacturer, the new tunnel will be able to test airfoils, etc., at speeds up to 700 miles an hour.



When .0001 inch = 1000 hours

Problem: To provide an air-tight joint where the insulated connectors of an airplane radio vibrator project through the metal shell. (Vibrator contacts disintegrated in *ten hours* at high altitudes, when shells were not air-tight.)

Westinghouse research engineers were ready with the answer—a method of *soldering* metal to porcelain.

The porcelain piece is painted with a solution of gold and platinum and is then fired. This reduces the metal to a firmly adhering glaze, which is coated with a flux and tinned for soldering.

This gold-platinum film—barely one ten-thousandth of an inch thick—is the reason radio vibrators today last as long as the plane.

Solder Seal is the only known method of completely and permanently hermetically sealing a porcelain-to-metal joint. It is another example of Westinghouse leadership in every phase of electrical development.

Westinghouse Electric & Manufacturing Company, Pittsburgh 30, Pa.

WESTINGHOUSE PRESENTS: *John Charles Thomas, Sunday 2:30, EWT, NBC.*
"Top of the Evening," Mon. Wed. Fri. 10:15, EWT, Blue Network

Westinghouse

PLANTS IN 25 CITIES OFFICES EVERYWHERE

ASTRONOMY

If Sun Were Hotter

The whole human race and all life on earth would be wiped out, but the earth would survive with only superficial burns, if the sun became a "new star."

► THE WHOLE human race and all life on earth would be wiped out, but the earth itself would suffer only superficial burns if the sun were to become a brilliant and hot "new star" or nova, as other stars have been known to do.

The American Astronomical Society, meeting in Philadelphia, was presented computations by its secretary, Dr. Dean B. McLaughlin of the University of Michigan Observatory, which show that if the sun increased about 100,000 times in brilliance and held this heat for 10 days, the crust might be melted to a depth of seven to eight miles but the continents and oceans would not be extensively altered.

New stars, which are seen to flash from comparative obscurity to great brilliance in just a few days, sometimes become temporarily millions of times brighter than normal, but Dr. McLaughlin assumed rather less spectacular but more frequently observed, increase of about 100,000 times. His theoretical study allows the star to shine at this terrific rate for 10 days, with its radiation partly intercepted by a planet at the same distance from it as the earth is from the sun. The planet is like the earth in size and composition and during the 10 days it receives a total of 3,800 trillion trillion (3,800,000,000,000,000,000,000,000,000) calories of heat from the blazing nova.

Contrary to popular belief this tremendous energy would be far from enough to vaporize or even to melt a planet like the earth. The mass of the earth is 6,000 trillion trillion (6,000,000,000,000,000,000,000,000,000) grams. Thus, the energy received is only 0.6 calories per gram, or enough to heat the entire earth's crust through only 300 degrees centigrade, assuming the earth's crust to have only 1/100 the mass of the whole earth.

Because of poor conductivity of the crust, however, the actual melting effect would be even more limited, Dr. McLaughlin estimated, probably affecting only the surface layers, to a depth of about seven or eight miles. The heat would then be sufficient to raise the siliceous rocks to the melting point of about 1,500 degrees centigrade. The

surface of the planet would boil and bubble and the rocks turn into liquid and vapor, but only while the nova could keep supplying the needed energy.

Soon after novae reach maximum brilliance they begin to fade. On the average, the sun as a nova could maintain the boiling of terrestrial rock only about a month, after which a return to normal would begin for both planet and star.

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Defect Detects Stars

► EIGHT STARS of remarkable redness, one of them blazing 500 times as brightly on red-sensitive photographic plates as on ordinary blue-sensitive emulsions, were reported to the Society by a young Mexican astronomer, Guillermo Haro, of the new National Astrophysical Observatory at Tonanzintla.

The first of these to be discovered by Senor Haro on the photographs taken by him with telescopes at the Oak Ridge, Mass., station of Harvard Observatory, where he did his researches, has a magnitude of 8.10 when measured on red

plates. On ordinary plates sensitive to blue and green light it would rate only 14.75, making it quite inconspicuous. (Stars achieve naked eye detection at about 6th magnitude.)

The Haro star is apparently a giant, millions of times larger in volume than our sun. Like the famous red giant stars, Betelgeuse in Orion's shoulder and Antares in the Scorpion's heart, it is a sort of huge bubble of such low density that it can be visualized as a luminous vacuum. It is cool as stars go, with a surface temperature of only about 1500 degrees centigrade. A variable star, it has a range of 1.5 magnitude, which means that it varies about four times in brightness.

Even the best glass lenses of astronomical telescopes cannot bring blue and red light to a focus at exactly the same place. This optical defect in refracting telescopes was used by Senor Haro in his continued search for red stars in the Hercules-Vulpecula region of the Milky Way.

An ingenious method of detecting red stars was developed some years ago by Dr. V. M. Slipher of Lowell Observatory and Dr. G. Z. Dimitroff of Harvard Observatory. It consists in taking photographs alternately at the blue and red focuses of the telescope, using panchromatic plates which are sensitive to red as well as blue light. At the blue focus, blue stars appear normal with small round images, but red stars appear as tiny black dots surrounded by halos.



NO WAITING—Although only partially completed, this airfield somewhere in France is already in use for gliders loaded with supplies for troops.

Blue light produces the central dot. The halo is due to red light being photographed out of focus.

Senor Haro's first red star was so red that the central dot was entirely absent. Closest approach in redness to this star was one discovered in 1935 by Drs. F. K. Edmondson and A. M. Rogers, then at Lowell Observatory.

Science News Letter, July 8, 1944

Unusual Double Stars

► UNUSUAL double stars in Cassiopeia, now visible toward the north in the evening sky, are believed to furnish further evidence in the evolution of nebulous matter in space into full-fledged stars.

The stars, known as SX and RX Cassiopeiae, are variable stars which owe their apparent changes in brightness to the fact that they are double. The components of both of these stars are large, giant stars, one a white A-type star and the other a yellow G-type star.

Discoveries reported to the meeting by Dr. Sergei Gaposchkin of Harvard Observatory indicate that the A-type white star in each case seems considerably smaller in photographic light than in visual or yellow light, an effect usually caused by stars of small nuclei being surrounded by extended atmospheres.

Entirely independent observations have been made on RX and SX Cassiopeiae by Dr. Otto Struve of the Yerkes and McDonald Observatories of the Universities of Chicago and Texas, who found the A-type star in each case surrounded by a thick envelope of nebulosity. It is probable that the envelope engulfs the entire system, including the giant G star.

Study of these stars is complicated by their being double, but a discovery of this kind could probably not have been made for a single star. Further complications in the case of RX Cassiopeiae arise from the fact that one of the two stars (which one is not known) every 517 days undergoes a rhythmic fluctuation in brightness which can be attributed only to physical changes within the star itself.

Science News Letter, July 8, 1944

Pleiades Are Receding

► THE STARS of the Pleiades, or Seven Sisters, are speeding away from the solar system at about five miles each second, according to a paper sent by Dr. J. A. Pearce, director of the Dominion Astrophysical Observatory at Victoria, British Columbia, for presentation before the

meeting. This figure agrees quite well with estimates based on the apparent motion of the stars across the sky.

At least six of the stars of this famous group, located in the shoulder of Taurus, the Bull, are visible to the naked eye. People with very keen eyesight can spot possibly 12 stars in all. But the cluster of stars, packed together about 30 times more densely than are the stars in the vicinity of the sun, is estimated to comprise at least 500 stars.

"Their spectra are exceedingly difficult to measure accurately," Dr. Pearce reported, "the spectral lines being very wide, nebulous and lacking in contrast. In general, for each star, only six or seven diffuse lines of hydrogen and helium are available for measurement. The poor quality of the spectral lines undoubtedly has discouraged students of stellar motion, leaving the motion of the cluster an unsolved problem."

The brightest stars of the cluster, although extremely blue stars, should be classed as dwarfs like the sun, Dr. Pearce believes. Alcyone, the brightest Pleiad, outshines the sun 730 times. On the average, however, the 12 stars visible without a telescope are only 200 times as bright as the sun, which makes their luminosities quite low for blue stars. The average diameter of these particular stars is only 2.6 times that of the sun.

The comparatively small diameter combined with the rapid rotation of these particular stars is believed to be largely responsible for the unusually diffuse character of their spectral lines.

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MILITARY SCIENCE

New Army Camouflage Net Resembles Woman's Veil

► A NEW TYPE open-mesh weave camouflage head net for use with the steel helmet and its plastic liner has been designed by the Quartermaster Corps and the Corps of Engineers of the War Department.

The netting is a modification of a type developed by the engineers for camouflaging field guns and artillery emplacements in theaters of operation, and can be manufactured on lace-making machines and certain types of knitting machines.

The head net has an elastic band attached to the net fabric which fits over the helmet liner and holds the net in place, while the net itself drapes over the outer steel helmet like a veil on a woman's hat. The ends hang down to cover either the face or the back of

the head and neck, to break up their characteristic outline. It can be worn either with the helmet or with the liner alone.

The mesh is large enough to permit leaves or twigs to be placed in the openings to blend into surroundings.

The net is treated with a mildew-proofing agent.

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MEDICINE

Disabler Preventive

Rheumatic fever may yield to vitamin P, a plant pigment in red pepper and lemon peel. Effects of the treatment appear consistently favorable.

► RHEUMATIC FEVER, dread cause of heart disease in children and young adults, may yield to a chemical found in red pepper and lemon peel. According to a report by Dr. James F. Rinehart, professor of pathology in the Medical School on the San Francisco campus of the University of California, a plant pigment, flavone, known as the permeability factor or vitamin P, has shown considerable promise as a treatment for the great disabler, rheumatic fever.

"To date 19 cases (15 children and four young adults) have been treated for periods of one month or longer by administration of vitamin P," Dr. Rinehart said. "Ten of the 19 cases studied had shown persistent activity of the rheumatic process for periods ranging from six to 17 weeks prior to treatment."

The effects of the treatment were not dramatic but appeared consistently favorable, Dr. Rinehart noted. All cases showed a slowing of the rate at which the red blood cells settled out from the blood serum. This rate is greatly accelerated in rheumatic fever, and a slowing of this rate is a gauge of improvement.

"As urgent as the need may be for an effective treatment for rheumatic fever, an even greater one exists for a preventive," said Dr. Rinehart. "Complete control of streptococcal infections, such as sore throats, is not possible at this time. If nutritional deficiency of vitamins C and P prove to be conditioning factors which prepare the soil for rheumatic fever, prophylaxis can be carried out.

"It seems improbable that improvement noted in these cases was coincidental. It is recognized, however, that rheumatic fever tends to run an unpredictable course and that spontaneous remissions may occur at any time. Consequently this must be considered a preliminary report and final judgment regarding the effectiveness of vitamin P as the treatment of rheumatic fever withheld until a larger number of cases have been studied."

While the bacterial cause of rheumatic fever has not been definitely established, the common occurrence of respi-

ratory infections with various strains of group A hemolytic streptococci preceding the rheumatic fever leads most doctors to believe that this organism is at least one of the causes. However, only a few streptococcal sore throats are followed by rheumatic fever which would seem to indicate that there are other contributing causes.

In a former paper Dr. Rinehart suggested that a mild condition of scurvy, caused by insufficient amounts of vitamin C, might be one of these contributing factors. Guinea pigs which had been deprived of vitamin C and then inoculated with hemolytic streptococci developed a condition similar to rheumatic fever in humans. Treatment of rheumatic fever patients with large amounts of vitamin C, although possibly beneficial, showed no pronounced effect on the course of the illness.

Subsequent investigations on a new factor, vitamin P, lead Dr. Rinehart to believe that the guinea pigs had probably been deprived of this vitamin as well as vitamin C. Also the new P vitamin was found to affect the capillary strength; lack of it caused the walls of the capillaries to become exceedingly

fragile and to rupture easily, causing hemorrhage. Since it is known that vitamin P acts with vitamin C in certain body chemistry, Dr. Rinehart decided to test vitamin P as well as vitamin C on rheumatic fever cases.

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CHEMISTRY

Rubber Replaces Wood In Storage Batteries

► WAFER-THIN rubber is now replacing wood as a plate separator in the manufacture of storage batteries, making it possible to ship batteries to battlefronts in a fully charged condition without the acid and water once necessary to insure the electrical charge.

The new use of rubber eliminates the possibility of buckling of wood, which was one of the major causes of battery failure. The plate separators will outlast wood at the ratio of five to one in acid of normal battery strength, increasing the useful life of the battery.

The microporous rubber, made up of millions of tiny cells per square inch, permits complete charging of the battery at the point of manufacture, and shipment without the liquid. This material was developed by scientists of the United States Rubber Company.

After the battery has been completely charged, the acid mixture is removed. The plates and separators are removed and completely dried. After taking off all moisture, they are replaced and the



RUBBER FOR WOOD—As the last step in the manufacturing of the new rubber battery separators, hot water is poured on the material to insure the removal of any foreign matter.

battery is re-sealed ready for shipment. Batteries thus treated have been found to retain 75% of the original charge after being in storage for more than a year.

The battery can be used immediately at the battle-front after distilled water and acid have been added.

The new method reduces the danger of loss of electrical charge from spilling

the acid mixture in transit. Freight charges are lower too, because of the reduced weight due to elimination of the acid and water mixture.

This new battery development will make possible large shipments of batteries in the postwar world without the weekly recharge that is now necessary.

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AERONAUTICS

Robot Planes Not New

Two decades ago, the Army had unmanned, bomb-carrying planes that were, on the whole, successful. They did not have jet propulsion.

► OVER TWO decades ago the U. S. Army had experimental models of unmanned, gyroscope-steered, bomb-carrying planes that as a whole were successful, but the experiments were discontinued because of the plane's inaccuracy in reaching specific targets.

An Army photograph of one of these models published a few months ago (see *SNL*, Jan. 1, 1944) shows that its appearance was not unlike the reported

German pilotless planes now being directed at England. The early American flying bombs were propelled by a propeller driven by an engine, not by jet propulsion. It was a biplane, not a monoplane.

The records in the U. S. Patent Office also show that robot planes were invented here in America as early as 1918 at the time of the first world war. The Office of War Information issued information supplied by the National Inventors Council and the U. S. Patent Office of the U. S. Department of Commerce which details two early inventions.

On April 18, 1918, the late Lawrence Burt Sperry, of the Sperry Gyroscope Company, filed an application with the U. S. Patent Office for a gyroscope robot plane. Sperry's plane was driven by an electric motor, and was so controlled that it could change course in flight. It carried a heavy load of explosives which was automatically detonated when the

robot plane reached its predetermined destination. The electric motor and the explosive units were separate. When the plane was over the target, the explosive charge was released, as a modern bomber now drops its load.

Foreseeing that the robot plane might be shot down by enemy aircraft, Sperry included a special mechanism which would cause the entire plane to explode if brought down before it reached its destination "so that the chance of doing damage to the enemy is greatly enhanced." U. S. patent 1,670,641 was granted on Mr. Sperry's invention on May 22, 1928.

A second patent application was made April 25, 1919, by Dr. Charles F. Kettering, now chairman of the National Inventors Council and Vice-President of General Motors Corporation, for an aerial torpedo.

Dr. Kettering's aerial torpedo is described in the patent application as, "... carrying a large charge of explosive, and having control mechanism adapted so to direct its movement that it may be caused to travel over a desired path and land upon a predetermined objective."

The mechanism had a biplane type fuselage, and was thrust through the air by a two-cycle gasoline motor operating a propeller. A gyroscopic compass controlled the altitude and direction in flight.

The Kettering aerial torpedo carried several hundred pounds of explosives. Like the modern German robot planes, it was launched from an inclined plane, or from a catapult. The torpedo was held to the catapult by a thin wire, just sufficiently strong to keep it from jumping off when the motor was turned on. As soon as the motor had developed suffi-

FLAMING PLANE—These pictures, taken by a camera installed under the guns in the nose of a plane (see *SNL* for June 10, p. 371), tell the death story of one Nazi plane. The left picture shows the aircraft skimming the tree tops before the hit. To the right, the Nazi craft is seen exploding in mid-air from shells shot from the same gun that was synchronized with the camera.



cient speed to sustain the torpedo in air, the launching wire would break and the plane take to the sky. U. S. Patent 1,623,121 was granted for the aerial torpedo on April 5, 1927.

It seems that the only new thing that

the Germans have done with their robot bombs is to replace the electric motor and gasoline motor with jet propulsion, which, by the way, was first developed by an Englishman.

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ENGINEERING

Fast Vulcanizing

A new electronic device for tire-repair does the process in only 10 minutes in combat areas. Expected to make postwar tires give 100,000 miles of service.

► A NEW tire-vulcanizing device employing electronic principles has been developed which makes it possible to complete major tire repairs in 10 minutes in combat zones.

This device, which promises to aid in extending the service life of postwar tires to 100,000 miles, was announced by Lt. Col. C. W. Vogt, Chief, Technical Staff of Supply, Transportation Corps, U. S. Army, at the meeting of the Society of Automotive Engineers in Philadelphia.

The 500-pound mobile military unit, designed to effect repairs at any time and replace Army tire-repair equipment weighing tons and taking hours to operate, was developed after reports from overseas revealed the existing equipment was too slow and unsatisfactory.

The device consists of a press ram equipped with an electrode connected with a high-frequency generator, and a press frame. The electronic energy develops internal heat within the tire, similar to the heat created by short-wave dia-

thermy equipment used in medicine. Spot patches can be made in a matter of minutes.

The ram and frame, fitted with cloth bags, which adjust themselves under pressure to the contour of the tire, eliminate the use of heavy, costly molds, and enable repairs to be made on any size tire. The use of internal heat obviates present vulcanizing hazards such as destructive over-heating of the rest of the tire when making a patch.

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Better Synthetic Tires

► WARTIME manufacturing methods promise to produce synthetic rubber tires in the postwar world that are low in cost, and of better quality than those which are being made today, J. E. Hale, of the Firestone Tire and Rubber Company, told the meeting.

He expressed the opinion that engineering and chemistry will develop the use of synthetic rubber, and new varie-

ties of better synthetics within two to four years.

The current tire shortage will be offset, so far as commercial vehicle needs are concerned, by growing production of increasingly better synthetic tires which will give good service but which will demand better care, curtailed vehicle operating speeds in warm weather, and reduced loads, Mr. Hale predicted.

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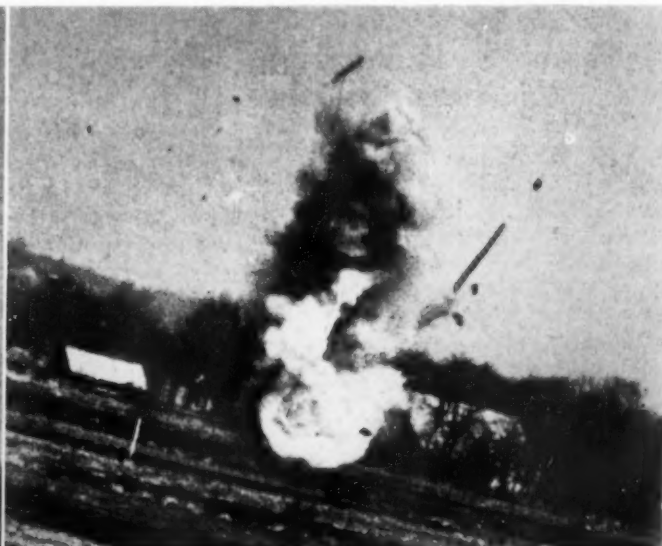
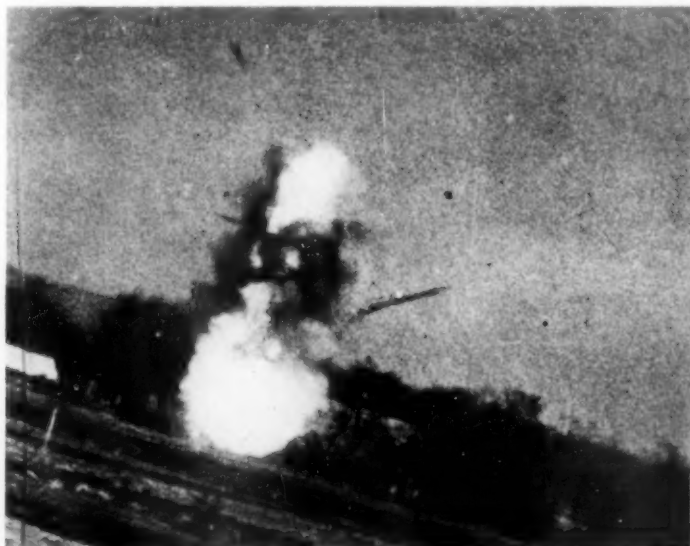
Engine Sludge Prevented

► FOUR STEPS to avoid dangers resulting from the formation of hot engine sludge in motor vehicles were recommended by H. C. Mougey, of Research Laboratories Division, General Motors Corporation, at the national transportation and maintenance meeting of the Society of Automotive Engineers.

The four steps include the application of oil filters to remove the sludge as it forms; adequate temperature control to prevent excessive heat which causes oil oxidation and sludge formation, without permitting engine temperatures to get so low as to form low-heat sludge; frequent crankcase draining to prevent sludge accumulations from becoming too large; and the use of high quality, heavy duty oils that have good resistance to oxidation.

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FINAL DESTRUCTION—An instant after the explosion, the right tip of the Nazi plane is visible (left); and then a few moments later, nothing is left but a flaming ball of fire plunging to the earth.



GEOLOGY

Morning Glory Pool Goes on A Rampage for Two Days

► PLACID Morning Glory Pool, known to practically all visitors to Yellowstone National Park as one of the most beautiful hot springs in the entire area, went berserk the evening of June 10, pushing water toward the highway to a depth of about one foot. Superintendent Edmund B. Rogers of the park reports that four fishermen returning from the Firehold River below the pool came upon the flood and reported it to the Old Faithful Ranger Station. Investigation disclosed the overflow of the erstwhile quiet pool. The park office has no record of Morning Glory Pool previously throwing any such tantrum.

While the cause of the eruption is not known, it may have been an internal reaction to the large amount of debris that thoughtless visitors had thrown into the water from time to time; for handkerchiefs, towels, tokens, pennies, automobile hubcaps, stewpans, cans, combs, smoking pipes, pens, pencils, and other peculiar items were in the debris suddenly disgorged. Since the trees in the immediate vicinity had not been touched, the water apparently was pushed out rather than thrown to any great height.

Clearing the throat of the pool of the up-chucked matter lowered the water level some 10 to 12 feet. Within two days of the eruption, however, the pool was running over at its normal rate, the water still quite cloudy. Indications are that the water will clear itself again and the pool resume the even tenor of its way.

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MEDICINE

Nylon Needle May Be Used In Childbirth Anesthesia

► THE NEWEST THING in caudal analgesia, the painless childbirth method you have been reading a lot about lately, is a flexible nylon needle for injecting the pain-killing drug. The needle was shown by Dr. Robert A. Hingson, Dr. Waldo B. Edwards and Dr. James L. Southworth, of the U. S. Marine Hospital, Staten Island, N. Y., and the Philadelphia Lying-In Hospital, at the meeting of the American Medical Association. The needle has not yet been released for general use and will not be, Dr. Hingson said, until he and his associates are satisfied that it will stand

up under the autoclaving needed to sterilize it before each use.

At present, many expectant mothers who ask their doctors for this method of banishing pain in childbirth are being disappointed to find they cannot have it. The method is not safe unless used in a hospital by a physician trained in the method. Dr. Hingson and associates are giving this training to doctors as fast as they can, but it will take time before every obstetrician in the country has an opportunity to learn it. The method consists in injecting a pain-killing drug into the caudal space at the base of the spine. It takes practice to learn how to find the exact space, and if the drug is injected into the wrong place, the results may be disastrous.

About 15 out of every 100 women cannot have the method because the bony structure at the lower end of their spines has closed over the caudal space and the drug cannot be injected.

Those who can have their babies by this method have the benefit not only of a safe, comfortable time while baby is being born, but are saved much blood loss. In some cases, this saving amounts to a transfusion. Important advantage of the method, too, is the fact that the baby is saved from any danger of asphyxia and breathes the minute his nose gets into the air outside his mother's body.

Science News Letter, July 8, 1944

AERONAUTICS

Two Emergency Runways Perfected for Planes

► TWO QUITE different ideas for emergency runways or landing areas for planes are subjects of patents.

One, covered by patent 2,351,273, issued to G. C. Littlefield of Monterey, Calif., contemplates the use of an exceedingly tough, hardy, runner-producing grass. This is to be planted on the selected site and encouraged to form a dense sod. Then a layer of crushed rock is to be laid on top of the sod. The grass will grow up through the rock, forming a second sod or mat on top.

The second proposal, more mechanical in its nature, is put forward by Gus Burton of Wadley, Ga., for patent 2,351,002. It consists of a series of frames in which friction rollers are mounted, braced with concrete, crushed rock or other suitable anchoring means. This runway is intended primarily for disabled planes forced to make belly landings, which are ordinarily hazardous.

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IN SCIENCE

MEDICINE

Army Medical Kit Ready for Jap-Held Prisoners

► SPECIAL medical supply kits for shipment to prisoners of war and civilian internees in the hands of the Japs have been developed for distribution by the International Red Cross. The work was done by a committee of officers in the Office of the Surgeon General, U. S. Army, in collaboration with British, Canadian and American Red Cross officials.

In addition to drugs, the kits contain dressings, simple types of dental and surgical instruments, sterilizing equipment, insecticides, and water purifiers.

The units are divided into three types, a 100-man unit, containing five separate packages, a hospital unit, and a bulk supplies unit. Ten 100-man units, plus one each of the other two units, will be sufficient for the needs of 1,000 men for three months, it is expected.

Approximately 126 different drugs are provided. Each package of the 100-man unit contains a booklet with instructions, written in non-technical terms, for use of the medicines.

The 100-man unit contains those drugs which can be best used by the layman, while the hospital and bulk supplies units are intended for use where doctors may be available.

The medicines selected are those most useful in treating diseases known to be prevalent in the Far East and for ailments likely to beset persons living under prison camp conditions.

Some of the diseases for which one or more medicines are prescribed are: anemia, fevers, beriberi, blood poisoning, diarrhea, dysentery, skin infections, scurvy, pellagra, pneumonia, meningitis, ulcers and rickets.

In planning the contents, the committee of officers had the benefit of advice from Dr. Charles N. Leech of Rockefeller Institute in New York, who was interned for several months in the Philippines after their conquest by the Japanese.

The kits are packed in special waterproof plywood cases, each bearing a large Red Cross. The labels are printed in English and in Japanese.

Science News Letter, July 8, 1944

ANCE FIELDS

AERONAUTICS

High Altitude Planes Raise Electrical Problems

► AIRCRAFT designers are dreaming of the day when airplanes will be able to fly at altitudes of nine or ten miles. This means that electrical engineers will have to solve equipment problems involved in flying at these high altitudes, Lt. Col. T. B. Holliday, of the Army Air Forces, told the American Institute of Electrical Engineers meeting in St. Louis.

One major problem is the difficulty of cooling electrical apparatus at high altitudes, in spite of the fact that the atmosphere is very cold. This is due to the fact that the density of the air decreases faster than the temperature. At 18,000 feet the air is one-half sea level density, at 36,000 feet it is one-fourth. The low temperature, combined with low density, removes almost all the moisture from the atmosphere. The problem of insulating electrical circuits at these altitudes is about four times as severe as it is at sea level.

At high altitudes, electrical apparatus must be designed for excellent commutation, since arcing cannot be tolerated. Arcing which might be considered minor at sea level can become a continuous flame at high altitudes.

Science News Letter, July 8, 1944

AERONAUTICS

"Hot Sandwich" De-Ices Airplane Propellers

► A NEW ELECTRICAL "hot sandwich" de-icer for the propellers of airplanes that fly at stratosphere levels, where temperatures as low as 60 degrees below zero Fahrenheit are encountered, has been developed by Dr. W. H. Taylor, Dr. R. E. Workman, and Dr. F. A. Koehler, of the Goodyear Tire and Rubber Company.

It consists of a rubber boot, made up like a sandwich from three layers of specially compounded synthetic rubbers, which fits over the entire leading edge of the propeller blade. This boot is only a few thousandths of an inch thick, and weighs about one pound.

The center layer, or "meat" of the sandwich, is a special rubber that can

conduct electricity. It is made by forming continuous chains of electrical conducting carbon particles through a sheet of non-conducting rubber. When the electric current is sent through this layer of the sandwich, it grows hot, thus melting the ice that has been formed.

The upper layer of the sandwich is an abrasion-resisting synthetic rubber. It protects the boot from abrasive forces of raindrops and ice particles which tear great holes in ordinary rubber.

The bottom layer is regular insulating rubber, that prevents the heat from escaping into the propeller blade, and the electric current from being short-circuited or grounded by the metal propeller.

It can be used as a de-icer to rid the propeller of ice already formed, or as an anti-icer to prevent its formation.

The new boot may also be used to prevent ice formation on radio aerial masts, pitot tubes or air-speed indicators, wing tips not accessible to hot-air heating, tail surfaces, engine cowlings, and radiator closures.

The new conducting rubber may be used in postwar years for heating pads and lightweight, electrically-heated blankets.

Science News Letter, July 8, 1944

SEISMOLOGY

Earthquake Centered Near Mexico-Guatemala Border

► A VIOLENT earthquake that recorded itself on American and Canadian seismographs early on Wednesday morning, June 28, was traced to an epicenter under the Pacific ocean, near the boundary between Mexico and Guatemala, by scientists of the U. S. Coast and Geodetic Survey, on the basis of data transmitted through Science Service.

Some of the instruments oscillated so strongly that the trace went clear off the recording paper, indicating a disturbance of really major proportions.

The first shock occurred at exactly one minute before four o'clock in the morning, Eastern War Time. The epicenter was near latitude 15 degrees north, longitude 93 degrees west.

Stations reporting were: Dominion Meteorological Observatory at Ottawa, Seismological Observatory at Pasadena, the observatories of the Jesuit Seismological Association at Georgetown University, St. Louis University, Fordham University and Spring Hill College near Mobile, Ala., and the observatory of the U. S. Coast and Geodetic Survey at Tucson, Ariz.

Science News Letter, July 8, 1944

DENTISTRY

Dying Teeth Saved by Sulfa Drug Treatment

► TEETH in their "dying throes" which ordinarily would have to be pulled are now being saved by use of a sulfa drug plus a relatively new antiseptic, zephiran, Dr. M. Eigen, dentist of Arlington, Va., reports (*Journal, American Dental Association*, July 1).

Dr. Eigen has tried this treatment in more than 100 cases of pulpitis. This condition is an inflammation of the tooth pulp which contains nerves and blood vessels. In some cases of pulpitis treated successfully, there had also been infection at the tip of the tooth root and pain which extended into the ear.

About 10% of pulp deaths occurred in Dr. Eigen's series of 100 cases.

The method of treatment consists, essentially, in cleaning out the cavity with zephiran, which is a wetting agent with antiseptic properties, and applying a sulfa drug. In some cases, zephiran alone succeeds in clearing up the trouble but the addition of the sulfa drug seems to give better results. Dr. Eigen believes, although he says more study will be needed to clear this point, that the action of the two drugs is more than additive. He thinks that one actually potentiates the other, almost algebraically, to greater action than either would have alone.

Science News Letter, July 8, 1944

INVENTION

Fused Quartz Bearings For Fine Instruments

► JEWEL bearings for scientific instruments and fine machinery can be made quickly and economically out of fused quartz, by a method on which George Keinath of Larchmont, N. Y., obtained patent 2,352,266. He makes one bearing after another from a rod of the fused quartz, by grinding a notch in the end, then polishing it to the necessary smooth finish, then cutting it off—and starting the process over again.

In addition to having the necessary degree of hardness, Mr. Keinath points out, fused quartz has a considerable advantage over natural jewels and synthetic jewel-bearing materials such as synthetic sapphire and glass, in its extremely low rate of expansion when heated. Instruments with fused-quartz bearings can be used at temperatures which would render bearings of other materials quite unreliable.

Science News Letter, July 8, 1944

AGRICULTURE

Nature Paints Cotton

Cotton plants with brown and green lints, instead of white, have been grown. In the future, there may be even more colors, producing rainbow-tinted cotton fields.

By MARTHA G. MORROW

See Front Cover

► COTTON FIELDS of the future may be rainbow-tinted instead of snowy white. Scientists, seeing that some cotton has already been painted by nature either brown or green, have begun to wonder just how many colors the cotton plant can be made to produce.

Soviet scientists report that they have developed natural-colored lints in red, green, auburn, brown, blue and khaki. Bolls of fibers tinted brown or green are being grown at the Delta Experiment Station at Stoneville, Miss., in cooperation with the U. S. Department of Agriculture.

Colored cotton has been spun and hand-loomed into novelty fabrics by the women of Fayetteville, Ark., and Abbeville, La. But Nature has not yet done as well as the chemist in producing sun-fast colors, for the fibers are uneven in shade and soon fade. So the day has not yet come when the exact colors desired for a uniform or dress can be selected while the cotton is still on the stalk.

Although the colored lints are not practical for commercial use, they are important in scientific study. Cotton geneticists have found the color in the lints to be valuable characteristics to use as "markers" in inheritance studies. A particular lint color may be found to be linked in heredity with some other characteristic that is important economically, but which is not so easily observed.

Visible When Opened

Varieties of cotton with brown fibers are found in every known species of wild or cultivated cotton that bears lint. The pigmentation, which is not visible until the boll opens, is located largely in the hollow inside, or lumen of the fiber cell.

During the period of fiber growth the lumen is filled with living protoplasm. In the mature, dried fiber, the dead protoplasm containing the coloring matter shrinks to a slender strand. A hollow tube is thus formed throughout the

length of the fiber. The cotton fiber resembles an empty garden hose of diminutive proportions, only it is more twisted.

At least eight varieties of cotton having brown lint have been grown in a single collection here in the United States, but the exact origins of most of these varieties are unknown.

A single branch of a plant bearing white cotton has been observed with brown lint, and from this a pure breeding strain of brown-lint cotton was established. A few years ago a brown-lint plant was found to have one branch bearing white cotton. There is thus good reason to believe that some brown-lint cottons may have originated as spores on plants of white cotton, and in other cases that certain species were originally brown and that white strains arose in those species.

Originated in Mutation

All the green cotton we now have is believed to have originated as a mutation in a cultivated field of upland cotton. It could have been a bud spore, or a change in the reproductive tissues of the plant. The fibers of the green-lint cotton are short and irregular, and soon fade to a mottled brown when exposed to light.

The green coloring is in the fiber wall and may be seen soon after the fibers begin to thicken. By the 25th day after the flowers first appear the coloring is quite apparent.

When the seed and lint produced by ordinary white cotton plants are separated, the lint weighs approximately one-third of the total combined weight. In the case of green-lint cotton, however, the yield is extremely low, the ginned lint weighing only about one-sixth of the combined weight of the seed and lint. Studies reveal that the low lint percentage and green pigmentation are due to the same factors of inheritance.

The green lint, strangely enough, contains about 30 times as much wax as the ordinary white cotton, about one-sixth of the weight of the lint being due to wax. The wax is of a type for which

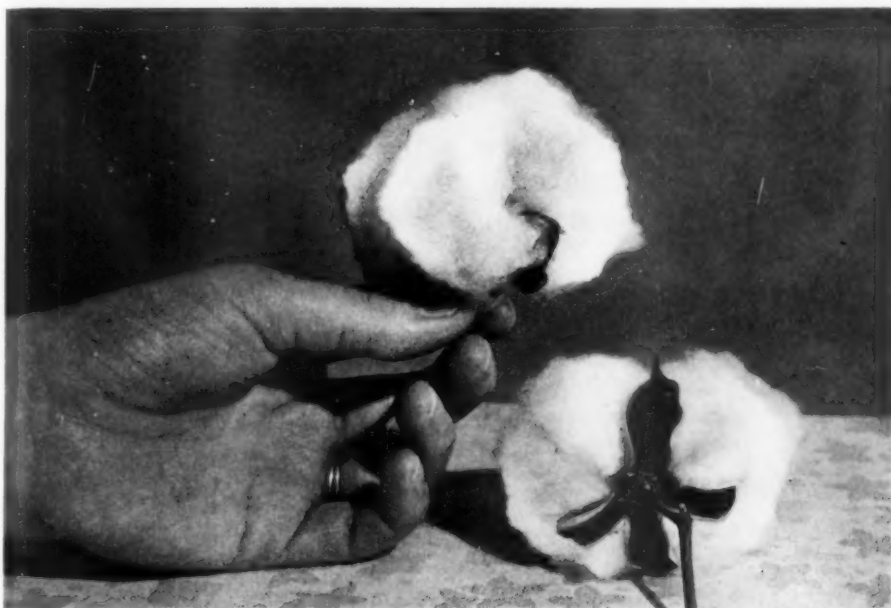
there is considerable commercial demand due to war conditions, but the high cost of extraction and low yield per acre makes production of the wax from green cotton impractical.

Brown and green fibers have been under investigation not only here in the United States, but also in the British Empire, since early in the century. Various shades of brown could be considered as red, auburn and khaki. But as yet the Russians are the only scientists reported to have developed blue fibers.

Cotton fibers for commercial use are either white or light cream. When the bolls in which the cotton is borne first open, the lint is a beautiful snow white. But the fiber is usually allowed to remain on the stalk for a while, becoming dingy. Physical and chemical changes, such as stain from the leaves, account for this as well as dirt, bits of leaves and other field material which cling to the



SINGLE FIBER—Often the length of a two-inch twisting cotton fiber is 2,000 times its width, as shown in this U. S. Department of Agriculture photograph.



OPEN BOLL—Bursting like popcorn from its brown boll, the lint is what gives a snowy appearance to the cotton field. If it were tinted, we might have rainbow fields.

fibers. Cotton dresses and shirts are made to look fresh and clean by chemical bleaching between the time the cloth leaves the weaving loom and reaches market.

Every fiber of cotton is produced by the outgrowth of a single epidermal cell. The number of fibers arising from the outer layer of one seed is estimated to be between 10,000 and 20,000. Although commonly referred to as "fibers," they are quite different in origin and structure from the long-bast fibers which are extracted from the stems of flax, hemp, jute and many other plants.

Some of the epidermal cells of the seed start to elongate on the day that the flower blooms. Others can be found in the initial stage of fiber development as late as 10 to 12 days from the date of blooming. At the end of 20 to 25 days the fiber has reached its full length.

The walls of the fiber thicken throughout the entire period of fiber growth, but it does not become marked until after the 20th day. The wall is thickened by materials produced in the living protoplasm of the fiber. They are deposited in successive layers upon the inner surface of the fiber walls and are responsible for its strength and flexibility.

Commercial cotton fibers vary in length from three-quarters of an inch to two inches, but most of the cotton grown in this country averages about an

inch in fiber length. The length ranges from 1000 to 3000 times the diameter of the fiber, the average diameter being about $1/1310$ inch.

There are 90,000,000 individual fibers in an average pound of cotton. Thus if the fibers were laid end to end, they would reach from Memphis to St. Paul, or from New York to Chicago.

Cotton is recognized as the world's most important fiber. For the quarter-century preceding the war, each citizen of the United States used approximately 26 pounds of lint cotton each year. Enough cotton is consumed in the United States each year to make a bolt of cloth 6,800,000 miles long. But the chances are that little if any of that cloth will be made of natural-colored fibers—at least for many years to come.

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If you would like to have samples of brown and green cotton, as well as a cotton boll, to experiment with and show your friends, you can secure the Cotton Unit of THINGS of science, a kit prepared by Science Service, by sending 50 cents to SCIENCE NEWS LETTER, 1719 N Street, N. W., Washington 6, D. C., and asking for Things unit No. 44.

Langbeinite, a rare potash-magnesia mineral used as a source of fertilizers, is found only in five countries—the United States, India, Germany, Austria and Poland.

BIOGRAPHY

Dr. C. G. Abbot Resigns As Smithsonian Secretary

➤ RESIGNATION of Dr. Charles G. Abbot as secretary of the Smithsonian Institution, effective July 1, has been announced. Dr. Abbot, who is now 72 years of age, joined the Smithsonian staff in 1895, and has been its chief administrative officer since 1928.

Although giving up heavy executive responsibility, the retiring secretary is not severing his connection with the Institution. He will retain a staff position as research associate, which will enable him to devote more time to certain investigations which he has had in hand for some years.

Dr. Abbot's entire research career has been devoted to the study of physical conditions on the sun. In recent years he has paid particular attention to the correlation between fluctuations in solar radiation and changes in weather on the earth. He has also developed apparatus for the direct utilization of solar energy in the production of usable forms of power and heat.

Dr. Abbot is a trustee of Science Service.

Until a new secretary is chosen by the Smithsonian Institution board of regents, Dr. Alexander Wetmore will serve as acting secretary.

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CHEMISTRY

Toluene May Be Made From Fractions of Petroleum

➤ TOLUENE, basic material for TNT (which in chemical longhand is tri-nitro-toluene) can be made synthetically from two cheap, abundant substances found in oil and natural gas, by a new process on which U. S. patent 2,352,199 has just been issued to Prof. Vladimir N. Ipatieff and George S. Monroe, both of Chicago.

The substances are benzene, which is one of the common light fractions of petroleum, and methane, simplest of the hydrocarbon gases, which is one of the chief constituents of most natural gases and is also produced in quantity in certain petroleum-cracking processes.

In the Ipatieff-Monroe synthesis, benzene and methane are subjected to high pressure, between 50 and 450 atmospheres, at a temperature of from 350 to 750 degrees Centigrade, in the presence of a catalyst. With the toluene, diphenyl is also synthesized; this co-product has a number of industrial uses.

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Do You Know

Brazil is now, for the first time, making *quinine* from its own cinchona trees.

China normally produces one-half the world's *tungsten* ore.

Antelope cannot live in the woods; they like open country.

Milk in a milk bottle left in the sunlight an hour may lose 40% of its important vitamin B₂ or *riboflavin*.

Most hard-shelled *turtles* are vegetarians or scavengers; but two groups, the snapping and the soft-shelled turtles, are more largely predatory.

The United States Forest Service estimates that the drain on the *forests* of the nation in 1943 amounted to nearly 17 billion cubic feet, and exceeded total growth by 50%.

Army poncho for tropical areas is made of *water-proofed nylon* and can be used as a fox-hole cover, ground sheet, or a moisture-proof bed-roll; two hooked together make a pup-tent.

Heavy paper bags lined with *asphalt*, used to ship materials to Army divisions overseas, are often used by soldiers when empty to protect clothing from dampness and for overshoes in wet fox-holes.

More than 8,000 tons of *rice* were harvested this year from a tract of land in New South Wales, Australia, which until this year produced only enough food for kangaroos and a few sheep.

Peru, original home of the white potato and still the home of many wild species, is importing improved seed stock from the United States to increase Peruvian commercial production.

The most exotic and perishable fruits and vegetables from *Latin America* are expected to become commonplace on U. S. dinner tables with increased post-war use of cargo planes.

The 4.2 chemical mortar, or *goon-gun*, was developed in 1924 to throw gas shells; it is now used to make smoke screens, smoke enemy out of fox-holes with burning phosphorus, and blast men and vehicles with high explosives.

ECONOMICS

Minerals Controlled

The United Nations have access to 85% of the world's mineral production; the Axis only 12%. Depletion of our reserves is serious, though shortages are not immediate.

► THE TOTAL commercial and political control of the United Nations over the world's mineral production, by value, is about 85%, while Germany and Japan between them account for only 12%, Dr. C. K. Leith, of the Materials Section of the War Production Board, told the American Society for Testing Materials, meeting in New York. These figures are based upon a survey made in 1939, and brought up to date to include wartime territorial gains.

The U. S. controls 34% of the world's mineral production politically, and another 10% commercially in other countries.

Depletion of our mineral reserves is becoming serious from the long-range point of view, requiring conservation, though shortages are not immediate, Dr. Leith pointed out.

"It has been predicted that technological advances and substitutions will lessen dependence on mineral supplies. The record to date does not bear this out. Production of all minerals has grown steadily in spite of many spectacular technological changes," he said.

Dr. Leith called for a long-range minerals control policy that would give foreign countries access to mineral supplies at a fair price, thus fostering international cooperation on the question of minerals. No nation of the world has enough of all minerals, he stated.

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Strength Measured

► CONCRETE strength in cement structures, during the curing and setting period, may be accurately measured by the use of embedded iron pull-out bars with enlarged ends, placed during pouring a short distance inside the face of the material.

This promising method, tested first by Russian engineers, was described at the meeting by Bailey Tremper of the Washington State Highway Department.

Construction men must know the strength of the curing concrete placed in structures before the holding forms or falsework can be safely removed. One method, now widely used and not en-

tirely satisfactory, includes the making of test cylinders of the same mixture as used in the construction, testing them at periods by laboratory compression machines, and assuming these cylinders cure at the same rate as the structure itself. The difference in environment of the cylinders and the structure itself is the principal source of error in this method.

The pull-out bar method, still experimental, makes use of a bar one-half inch in diameter, with an enlarged end three-fourths inch in diameter and nearly an inch long. The amount of pull to get the bar out of the hardening concrete is used as a measure of strength.

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Portland Cements Tested

► FIFTY-TWO samples of commercial portland cement imported into Venezuela from 11 European countries, China, Japan, and the United States or produced in Venezuela have been recently subjected to tests in that country under methods recommended by the American Society for Testing Materials and most of them found to comply at least with the minimum specifications of the Society. Several countries, it was found, produce very excellent cements.

The testing was carried out under the direction of Eugene V. Barrett, chief of the laboratory of the Venezuela Ministry of Public Works, who reported the results at the Society meeting.

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WYOMING

Yes, even THIS summer you may fish in its mountain streams, ride horseback through its hills and canyons, find Indian relics and marine fossils in a region of great historical and geologic interest.

The Patons welcome a limited number of guests at their ranch in the Big Horn country. They offer plenty of ranch grown food, comfortable cabins and gentle horses. May they tell you more? Write:

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For many years, RCA Laboratories have had a constant interest in the technical development of FM. Research in this field continues, but most of

it is related to the war effort and is of a military nature . . . Prior to the war RCA manufactured and sold FM broadcast transmitters. After the war RCA will manufacture and sell a complete line of FM transmitters as well as high-quality super-FM receivers, utilizing a new type of circuit.

When peace comes RCA will use its background of experience and engineering facilities in the broadcast transmitter and receiver fields, to build the type of apparatus broadcasters will need and receiving sets which will reproduce all broadcast programs with utmost realism and tonal quality.



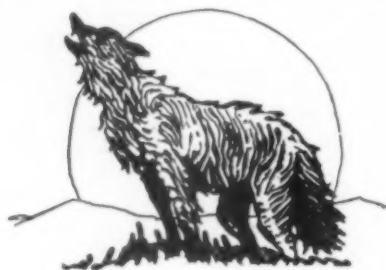
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Admired Enemy

► WOLVES, from the beginning of man's existence, have been among the most difficult and dangerous of the wild beasts with which he has had to contend. Yet everywhere men have held up wolves (perhaps idealized wolves) as patterns for themselves. Wolf totems are frequent among primitive tribes; Rome was founded on a wolf-nurse legend; in our Army today is a Timber Wolf division, and soldiers who pass the most exacting of commando tests are dubbed Wolf Scouts.

Mankind has certainly had plenty of opportunity to become acquainted with wolves, for the original range of these grim, gray predators covered practically all of North America, most of Asia and the whole of Europe, Stanley P. Young and Edward A. Goldman point out in an authoritative new book, *The Wolves of North America*. A she-wolf may or may not have suckled Romulus and Remus, but wherever the human race was born it is practically certain that there were wolves near its cradle—more likely as would-be abductors than as volunteer nurses.

Stone Age men, with their primitive

weapons and weak social organizations, were no great menace to wolves; the two species could live side by side, and there was food enough for both. But as human culture advanced and human numbers multiplied, the wolf's food-animals were decimated or driven off by the spread of farming and livestock herding. Wolf raids on sheepfolds and cattle pastures became intolerable, and the wolves had to go. They were swept from western Europe and the more civilized parts of Asia several centuries ago, and their American brethren followed them down the unreturning trail as rapidly as this continent became well settled.

Naturally, wolves survived longest where the country was roughest, discouraging human settlement and at the same time affording shelter both to the wolves and their normal prey. Thus, we have records of wolves still existing in the Adirondacks and in the mountains

of Pennsylvania until about the middle of the nineteenth century, and until two or three decades earlier than that among the steep hills of southern Ohio. There are gray wolves still, though in greatly diminished numbers, over a wide range of timber and range country in the mountainous West, and red wolves in a block of territory including most of Arkansas and parts of Texas and Louisiana. But from most of the haunts of man, old Lobo has vanished.

Ironically, the coyote or prairie wolf survives and even increases where the big timber wolf has been stamped out. That may be due, at least in part, to the fact that the coyote is merely a sneak-thief, a "snapper-up" of unconsidered trifles, and not a bold robber who takes more valuable things by violence. The one is a mere nuisance: we may curse him but we are apt to tolerate him. The other is a menace, and we kill him.

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MEDICINE

Polio Treatment

► THIS TIME of year brings to parents the annual worry over infantile paralysis. The worry is not likely to be less in view of a recent unfavorable report on the Kenny treatment for the disease.

The report was made by a group of specialists in orthopedic surgery appointed by the American Medical Association, the American Academy of Orthopedic Surgeons and the American Orthopedic Association. During the past two years they visited 16 clinics in six cities and examined 740 patients, about 650 of whom had been treated by Miss Kenny's method.

From what they saw, they conclude that the difference between the Kenny treatment and "orthodox" treatment in the number of patients helped to recover without paralysis is not so great

as Miss Kenny has stated; that even starting the Kenny treatment very early does not prevent or minimize the degree of permanent paralysis; that continuous hot packs for all patients with minimal evidence of "spasm" is of questionable value and an unnecessary waste of manpower and hospital beds.

The committee reported seeing several cases in which paralysis progressed after the Kenny treatment had been started and pointed out that some features of the Kenny treatment, such as muscle reeducation, have been known and used for many years. The committee also disagreed with Miss Kenny on the use of braces and respirators. It acknowledged that the wide publicity given the Kenny method has stimulated doctors generally to reevaluate known methods of treating the disease and to treat it more effectively.

Although the members of this committee disagree with Miss Kenny and do not favor her treatment, a number of other authorities believe it is valuable. Further study may settle the problem, or may develop specific methods for preventing or curing the disease. Meanwhile, if your child is attacked by infantile paralysis the best thing you can do is to get a good doctor and rely on his advice about treatment.

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• First Glances at New Books •

► **SOLDIERS AFRAID?** Indeed they are, we learn at first hand from the hardy veterans of fierce fighting in Spain—the men of the Abraham Lincoln Brigade, American volunteers. Young soldiers and their friends and families will read with interest the graphically presented report, of what these men found out about **FEAR IN BATTLE**, just published by *the Infantry Journal* (25c). Fear, is generally experienced just before combat rather than during it, John Dollard, assisted by Donald Horton, reveals in this report. It is dissipated by action; reduced by foreknowledge of what combat—and fear—is like. Most distressing fear for veterans is of being crippled for life—men in first combat are worried most by the fear that they will be cowards. Treatment for fear as prescribed by these veterans: For the veteran who cracks up, removal from front lines. For the green recruit, a frank talk by other men in his unit. For the chronic deserter, the firing squad.

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► **THE FORTUNE ATLAS** for world strategy, **LOOK AT THE WORLD**, by Richard Edes Harrison (*Alfred A. Knopf*, \$3.50), contains 33 pages of maps in color and 11 pages in black and white. The maps are drawn from the point of view of the air age. They are based upon the problems of world communications, international relations and military strategy.

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► **A DESCRIPTIVE STORY** is **THE AMAZING PETROLEUM INDUSTRY**, (*Reinhold*, \$2.25) by V. A. Kalichevsky, a petroleum chemist, that outlines for the layman in an interesting and non-technical way what petroleum is, what it does, and tells about the products and by-products obtained from it.

Science News Letter, July 8, 1944

► **WORLD MAPS AND GLOBES** (*Essential Books*, \$2.50) by Irving Fisher and O. M. Miller, presents to the general reader a concise readable discussion of the various kinds of maps and how to judge them. A new method is described for spotting the distortion in all flat maps.

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► **PROSPECTS FOR AVIATION** after the war from the viewpoint of the private citizen are carefully analyzed in **WINGS AFTER WAR** by S. Paul Johnson (*Duell,*

Sloan & Pearce, \$2.00), just off the press. Limited to the immediate postwar world, cold light is thrown on the many promised aviation wonders, and a realistic estimate of the place of aviation in post-war economy is presented.

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● Just off the Press ●

THE ARGASIDAE OF NORTH AMERICA, CENTRAL AMERICA AND CUBA—R. A. Cooley and Glen M. Kohls—*American Midland Naturalist*—152 p., illus., \$2. **American Midland Naturalist**, Monograph No. 1, ed. by Theodor Just.

CANADA, Our Dominion Neighbor—Merrell Denison—*Foreign Policy Assoc.*—96 p., illus., paper, 25c. **Headline Series**, No. 46.

COUNTERFEITING, Crime against the people—Lawrence Dwight Smith—*Norton*—254 p., illus., \$3.50. The author, who was formerly in the Army's Military Intelligence Department, had the cooperation of government agencies in preparing this book which tells you how to detect bad money.

FEAR IN BATTLE—John Dollard, assisted by Donald Horton—*Infantry Journal*. 64 p., illus., paper, 25c.

THE FIELD SEED INDUSTRY IN THE UNITED STATES, An Analysis of the Production, Consumption and Prices of Leguminous and Grass Seeds—Frank Victor Beck—*Univ. of Wisconsin Press*—230 p., illus., \$3.

JAPAN, An Economic and Financial Appraisal—Harold G. Moulton, Junichi Ko—*Brookings*—495 p., illus., \$4.

MEDICAL EDUCATION IN THE UNITED STATES BEFORE THE CIVIL WAR—William Frederick Norwood—*Univ. of Pennsylvania Press*—487 p., \$6.

MEET DR. FRANKLIN—Carl Van Doren and others—*Franklin Institute*—234 p., \$2.50.

MITOSIS, The Movements of Chromosomes in Cell Division—Franz Schrader—*Columbia Univ. Press*—110 p., illus., \$2.

PEOPLES OF FRENCH INDOCHINA—Olov R. T. Janse—*Smithsonian Institution*, 28 p., illus., 25c. **War Background Studies**, Number 19 (Publication 3768).

PROCEEDINGS OF THE INTERNATIONAL STUDENT ASSEMBLY—William Allen Neilson—*Oxford Univ. Press*—159 p., \$1.75.

ROMANCE OF EXISTENCE—Ross Bundy—*Pieman*—188 p., \$2.

SYSTEMATIC INORGANIC CHEMISTRY, of the Fifth-and-Sixth-Group Nonmetallic Elements—Don M. Yost and Horace Russell—*Prentice-Hall*—423 p., illus., \$6., \$4.60 to schools.

THEY FLY TO FIGHT, The Story of Airborne Divisions—Keith Ayling—*Appleton-Century*—191 p., \$2.50.

WAR BELOW ZERO, The Battle for Greenland—Bernt Balchen, C. Ford, O. La Farge—*Houghton Mifflin*—127 p., illus., \$2.

THE WOLVES OF NORTH AMERICA, Part I, Their History, Life Habits, Economic

Status, and Control—Stanley P. Young—Part II, Classification of Wolves—Edward A. Goldman—*American Wildlife Institute*, 636 p., illus., \$6.

WOOD CHEMISTRY—Louis E. Wise, ed.—*Reinhold*—900 p., illus., \$11.50.

Science News Letter, July 8, 1944

PHYSICS

Two Physics Awards Of \$2,000 to Be Given

► **TWO** Charles L. Mayer Awards of \$2,000 each will be given for contributions submitted before Jan. 1, 1946, on the nature of light, the National Science Fund has announced.

One award, intended to encourage interpretation of facts already known to the specialist, will be given for an outstanding contribution to our basic understanding of the nature of light and other electromagnetic phenomena.

The second prize, designed to stimulate work on one of the most fundamental unsolved problems in physics, will be awarded for an outstanding comprehensive contribution to a logical, consistent theory of the interaction of charged particles with an electromagnetic field, including the interaction of particles moving with relative high speeds.

Contributions should be submitted to the National Science Fund of the National Academy of Sciences, 2101 Constitution Ave., Washington 25, D. C.

Science News Letter, July 8, 1944

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• New Machines and Gadgets •

✿ **NAIL HOLDER** and finger guide, recently patented, is designed to prevent finger smashing by unskilled nail drivers. The device fits over one finger like a thimble, and holds the nail in a special groove during the initial blows.

Science News Letter, July 8, 1944

✿ **SPlicing SLEEVE**, to unite the ends of two wire cables or to form an eye loop on the end of one of them, is oval in shape and is made of copper with an interior coating of a brittle metal. The sleeve is firmly crimped on the cable with a plier-like hand tool or by a foot-operated set of dies.

Science News Letter, July 8, 1944

✿ **REVOLVING CHAIR** for boudoir or living room, recently patented, has stationary legs and a revolving circular seat with its mechanism concealed. The chair may be made with a concealed make-up mirror in the back, hinged so that it may be swung to a usable position.

Science News Letter, July 8, 1944

✿ **CRIMPING TOOL** shown in the picture firmly fastens terminals on elec-



tric wiring without the use of solder or heat. Pressure on the handles crimps the terminal connections to form a strong joint which offers little electrical resistance and resists corrosion.

Science News Letter, July 8, 1944

✿ **INK ERADICATOR** applicator of fountain-pen shape and size has two barrels in the single container, one for each of the two commonly used fluids, and each with its own point. Light pressure on finger buttons causes discharges. It is filled by suction.

Science News Letter, July 8, 1944

✿ **DOG COLLARS**, each carrying one or more germicidal powder-distributing pads, keep the animals free of fleas and other vermin. The powder is placed in cap-covered receptacles inserted in the collar. Muscular movements in the dog's neck work it through to the animal's skin.

Science News Letter, July 8, 1944

✿ **DUST EXPLOSION** chamber, for use in investigating dust explosions under test conditions comparable with those in factories, is a cylinder two feet in diameter and seven feet long, with steel doors at each end. Two revolving brushes on a rotating frame disperse the dust inside the bomb.

Science News Letter, July 8, 1944

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N. St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 215.

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